SIGMAGUARD™ CSF 650

DESCRIPTION

Two-component, solvent-free, amine-cured epoxy coating

PRINCIPAL CHARACTERISTICS

- Tank coating for crude oil/ballast and aliphatic petroleum products
- Also suitable as a coating system for the storage and transportation of drinking water
- Good resistance to various chemicals
- Excellent resistance to crude oil up to 60°C (140°F)
- Meets the requirements of EI 1541 2.2 (coating systems for aviation fuel storage tanks and pipes)
- One-coat protection for steel structures, ships and storage tanks with excellent corrosion resistance
- Can be applied by heavy-duty, single-feed, airless spray equipment (60:1)
- Reduced explosion risk and fire hazard
- Good visibility due to light color
- A clear (semi-transparent) version is available for systems reinforced with chopped glass fibers or glass fiber mats

COLOR AND GLOSS LEVEL

- Green, offwhite, clear (semi-transparent)
- Gloss

BASIC DATA AT 20°C (68°F)

Data for mixed product	
Number of components	Two
Mass density	1.3 kg/l (10.8 lb/US gal)
Volume solids	100%
VOC (Supplied)	max. 143.0 g/l (approx. 1.2 lb/US gal) Directive 2010/75/EU, SED: max. 109.0 g/kg EPA Method 24: 120.0 g/ltr (1.0 lb/USgal)
Recommended dry film thickness	300 - 600 µm (12.0 - 24.0 mils) depending on system
Theoretical spreading rate	3.3 m^2/l for 300 µm (134 ft^2/US gal for 12.0 mils)
Dry to touch	8 hours
Overcoating Interval	Minimum: 24 hours Maximum: 20 days
Full cure after	5 days
Shelf life	Base: at least 24 months when stored cool and dry Hardener: at least 24 months when stored cool and dry

Notes:
- See ADDITIONAL DATA – Spreading rate and film thickness
- See ADDITIONAL DATA – Overcoating intervals
- See ADDITIONAL DATA – Curing time

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RECOMMENDED SUBSTRATE CONDITIONS AND TEMPERATURES

Substrate conditions

- Steel; blast cleaned to ISO-Sa2½, blasting profile 50 – 100 µm (2.0 – 4.0 mils)
- Suitable primer; NOVAGUARD 260, SIGMACOVER 280, SIGMAPRIME series or SIGMACOVER 522, depending on system requirements
- Steel; power tooling to ISO-St3 for small and isolated areas (like repairs and joint welds) in fresh water and potable water tanks where spot blasting might be impractical

Substrate temperature and application conditions

- Substrate temperature during application and curing should be above 5°C (41°F)
- Substrate temperature during application should be at least 3°C (5°F) above dew point

SYSTEM SPECIFICATION

- SIGMAGUARD CSF 650: 1 x 300 µm (12.0 mils); or a suitable primer of 50 µm (2.0 mils) + SIGMAGUARD CSF 650: 1 x 250 µm (10.0 mils)

INSTRUCTIONS FOR USE

Mixing ratio by volume: base to hardener 80:20 (4:1)

- At lower temperature, the viscosity will be too high for spray application
- For recommended application instructions, see working procedure
- The temperature of the mixed base and hardener should preferably be above 20°C (68°F)
- No thinner should be added

Induction time

None

Pot life

1 hour at 20°C (68°F)

Note: See ADDITIONAL DATA – Pot life

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Airless spray

- Use heavy-duty, single-feed, airless spray equipment, preferably 60:1 pump ratio and suitable high-pressure hoses/in-line heating or insulated hoses may be necessary to avoid cooling down of paint in hoses at low air temperature
- Application with 45:1 airless spray equipment is possible, provided in-line, heated high-pressure hoses are used
- Length of hoses should be as short as possible

Recommended thinner
No thinner should be added

Nozzle orifice
Approx. 0.64 mm (0.025 in)

Nozzle pressure
At 20°C (68°F) paint temperature min. 28.0 MPa (approx. 280 bar; 4061 p.s.i.). At 30°C (86°F) min. 22.0 MPa (approx. 220 bar; 3191 p.s.i.)

Note: In case of using 45:1 airless spray equipment, the paint must be heated to approximately 30°C (86°F) in order to obtain the right application viscosity

Brush/roller

Recommended thinner
For stripe coating and spot repair only, no thinner should be added

Cleaning solvent
THINNER 90-53 or THINNER 90-83

Notes:
- All application equipment must be cleaned immediately after use
- Paint inside the spraying equipment must be removed before the pot life has been expired

ADDITIONAL DATA

Spreading rate and film thickness	
DFT	**Theoretical spreading rate**
250 µm (10.0 mils)	4.0 m^2/l (160 ft^2/US gal)
300 µm (12.0 mils)	3.3 m^2/l (134 ft^2/US gal)
600 µm (24.0 mils)	1.7 m^2/l (67 ft^2/US gal)

Note: Maximum DFT when brushing: 200 µm (8.0 mils)

Measuring wet film thickness

- A difference is often obtained between the measured apparent WFT and the real applied WFT. This is due to the thixotropy and the surface tension of the paint, which retards the release of air, trapped in the paint film for some time
- A practical recommendation is to apply a WFT, which is equal to the specified DFT plus 60 µm (2.4 mils)

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Measuring dry film thickness

- Penetration of the measuring gauge into the paint film may be observed due to low initial hardness. Care should be taken to prevent unnecessary low readings
- The DFT should be measured using a calibration foil of known thickness placed in between the coating and the measuring device

Overcoating interval for DFT up to 300 µm (12.0 mils)						
Overcoating with...	**Interval**	**5°C (41°F)**	**10°C (50°F)**	**20°C (68°F)**	**30°C (86°F)**	**40°C (104°F)**
itself	Minimum	3.5 days	36 hours	24 hours	16 hours	12 hours
	Maximum	20 days	20 days	20 days	14 days	7 days

Note: Surface should be dry and free from any contamination

Curing time for DFT up to 300 µm (12.0 mils)		
Substrate temperature	**Dry to handle**	**Full cure**
5°C (41°F)	60 hours	15 days
10°C (50°F)	30 hours	7 days
20°C (68°F)	16 hours	5 days
30°C (86°F)	10 hours	3 days
40°C (104°F)	8 hours	48 hours

Notes:

- Adequate ventilation must be maintained during application and curing (please refer to INFORMATION SHEETS 1433 and 1434)
- For drinking water tanks, a tank wash should be carried out after full cure and before the tank goes into service
- When used as coating system for storage and transport of drinking water the recommended working and washing procedure should be followed

Washing procedures

- The recommended washing procedure must be applied after completion of the application.
- Sufficient time for full-curing and ventilation must be allowed in accordance with the recommendations as stated in the latest Product Data Sheets and working procedure.
- Always an adequate washing procedure should be followed.
- Several adequate washing procedures are available and may be used (see e.g. washing procedure described in relevant certificate).

Example 1: Adequate washing procedure

- After full curing of the system as per the latest PDS, the tank should be filled completely with fresh tap water
- The fresh tap water should remain in the tanks at least 4 full days
- Afterwards all tank compartments such as inner hull sides, bottom and deck-heads etc. should be thoroughly washed using high pressure water
- After washing, the tanks should be thoroughly drained
- After this procedure the tanks will be fit to carry drinking water

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Example 2: Adequate washing procedure

- All personnel should wear watertight suits, boots and gloves properly cleaned with a sodium hypochlorite solution (1% active chlorine per liter)
- All tank sides, bottom and deckheads etc. should be brush cleaned or high-pressure spray cleaned with 1% active chlorine solution as above|note: this can also be done by butterworth washing
- All parts should be high pressure cleaned with tap water and tanks drained
- Concentrated active chlorine solution should be sprinkled on bottom; approx. 1 liter per 10 m^2 (1 quart per 100 ft^2)
- Tanks should be filled with tap water to a depth of approx. 20 cm (8 inches) and the water should remain in the tank for at least 2 hours (max. 24 hours)
- Tanks should be thoroughly flushed out with tap water
- Depending upon local regulations it may be necessary to take water samples, after filling tank completely, to check on bacteria
- After this procedure the tanks will be fit to carry drinking water

Pot life (at application viscosity)	
Mixed product temperature	**Pot life**
20°C (68°F)	1 hour
30°C (86°F)	45 minutes
40°C (104°F)	25 minutes

Note: Due to exothermic reaction, temperature during and after mixing may increase

DISCLAIMER FOR STORAGE AND TRANSPORT OF DRINKING WATER:

- SIGMAGUARD CSF 650 is approved for purpose in accordance with the requirements of the relevant certificate
- PPG Protective & Marine Coatings does not accept any responsibility or liability for any odor, taste or contamination imparted to the drinking water from the coatings or products retained in the coating

SAFETY PRECAUTIONS

- For paint and recommended thinners see INFORMATION SHEETS 1430, 1431 and relevant Material Safety Data Sheets
- Although this is a solvent-free paint, care should be taken to avoid inhalation of spray mist, as well as contact between the wet paint and exposed skin or eyes
- Ventilation should be provided in confined spaces to maintain good visibility
- If workers are exposed to concentrations above the exposure limit, they must use appropriate personal protective equipment (PPE).

WORLDWIDE AVAILABILITY

It is always the aim of PPG Protective and Marine Coatings to supply the same product on a worldwide basis. However, slight modification of the product is sometimes necessary to comply with local or national rules/circumstances. Under these circumstances an alternative product data sheet is used.

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REFERENCES

• CONVERSION TABLES	INFORMATION SHEET	1410
• EXPLANATION TO PRODUCT DATA SHEETS	INFORMATION SHEET	1411
• SAFETY INDICATIONS	INFORMATION SHEET	1430
• SAFETY IN CONFINED SPACES AND HEALTH SAFETY, EXPLOSION HAZARD – TOXIC HAZARD	INFORMATION SHEET	1431
• SAFE WORKING IN CONFINED SPACES	INFORMATION SHEET	1433
• DIRECTIVES FOR VENTILATION PRACTICE	INFORMATION SHEET	1434
• CLEANING OF STEEL AND REMOVAL OF RUST	INFORMATION SHEET	1490
• SPECIFICATION FOR MINERAL ABRASIVES	INFORMATION SHEET	1491
• RELATIVE HUMIDITY – SUBSTRATE TEMPERATURE – AIR TEMPERATURE	INFORMATION SHEET	1650

WARRANTY

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